HR-178 Road Rater Dynamic Deflections For Determining Structural Rating Of Flexible Pavements

Key Words: Road Rater, Dynamic deflection measurements, Flexible pavements

ABSTRACT

The Road Rater is a dynamic deflection measuring appa-ratus for flexible base pavements. The basic operating principle of the Road Rater is to impart a dynamic loading and measure the resultant movement of the pavement with velocity sensors. This data, when properly adjusted for temperature by use of a nomograph included in this report, can be used to determine pavement life expectancy and estimate overlay thickness required. Road Rater testing will be conducted in the spring, when pave-ments are in their weakest condition, until seasonal correction factors can be developed.

The Road Rater does not have sufficient ram weight to effectively evaluate load carrying capacity of rigid pavements. All rigid pavements react similarly to Road Rater testing and generally deflect from 0.65 to 1.30 mils. Research will be continued to evaluate rigid pavements with the Road Rater, however.

The Road Rater has proven to be a reliable, trouble free pavement evaluation machine. The deflection apparatus was originally front-mounted, but was rear-mounted during the winter of 1977-78. Since that time, van handling has greatly improved, and front suspension parts are no longer overstressed due to improper weight distribution.

The Road Rater provides a fast, economical, nondestructive test method to evaluate flexible pavements. Road Rater test data can be used to predict pavement life, set priorities for asphaltic concrete resurfacing, and design asphaltic concrete overlays.

Temperature and seasonal variations significantly affect Road Rater deflection readings and must be considered. A nomograph included in this report adjusts for temperature, but does not correct for seasonal effect. Road Rater testing will be conducted in the spring until seasonal correction factors can be developed.

The Road Rater has not successfully evaluated rigid pavements, but research will continue in this area.

1. Recommendations for continuing Road Rater research, evaluation and application are as follows:A computer program should be established to reduce Road Rater raw data (Range and Sensor reading) to

mean deflection (mils) and/or structural rating. This computer printout would be similar to present friction testing printouts, and would greatly reduce Road Rater data reduction manpower needs and costs.

2. Seasonal variation study should continue to develop seasonal correction factors. Seasonal test roads will be studied concurrently with routine testing during 1979 to develop this relationship. All Road Rater testing will be conducted in the spring until the seasonal relationship is established.

3. An asphaltic concrete overlay design method should be established based on Road Rater de-flection readings. The AASHTO Interim Guide for Design of Pavement Structures 1972 will be used as a base document for this study.

4. AASHTO Structural numbers should be compared to Road Rater Structural Ratings during 1979 on asphaltic concrete overlay projects. This analysis will enable us to refine Road Rater evaluation of flexible pavements. Roads will be tested before resurfacing and several months